Offshore Wind Development Potential and Possible Timetables on Virginia's OCS

MMS Federal-State-Local Task Force Meeting

Virginia Beach Convention Center

Virginia Beach, VA

08 December 2009

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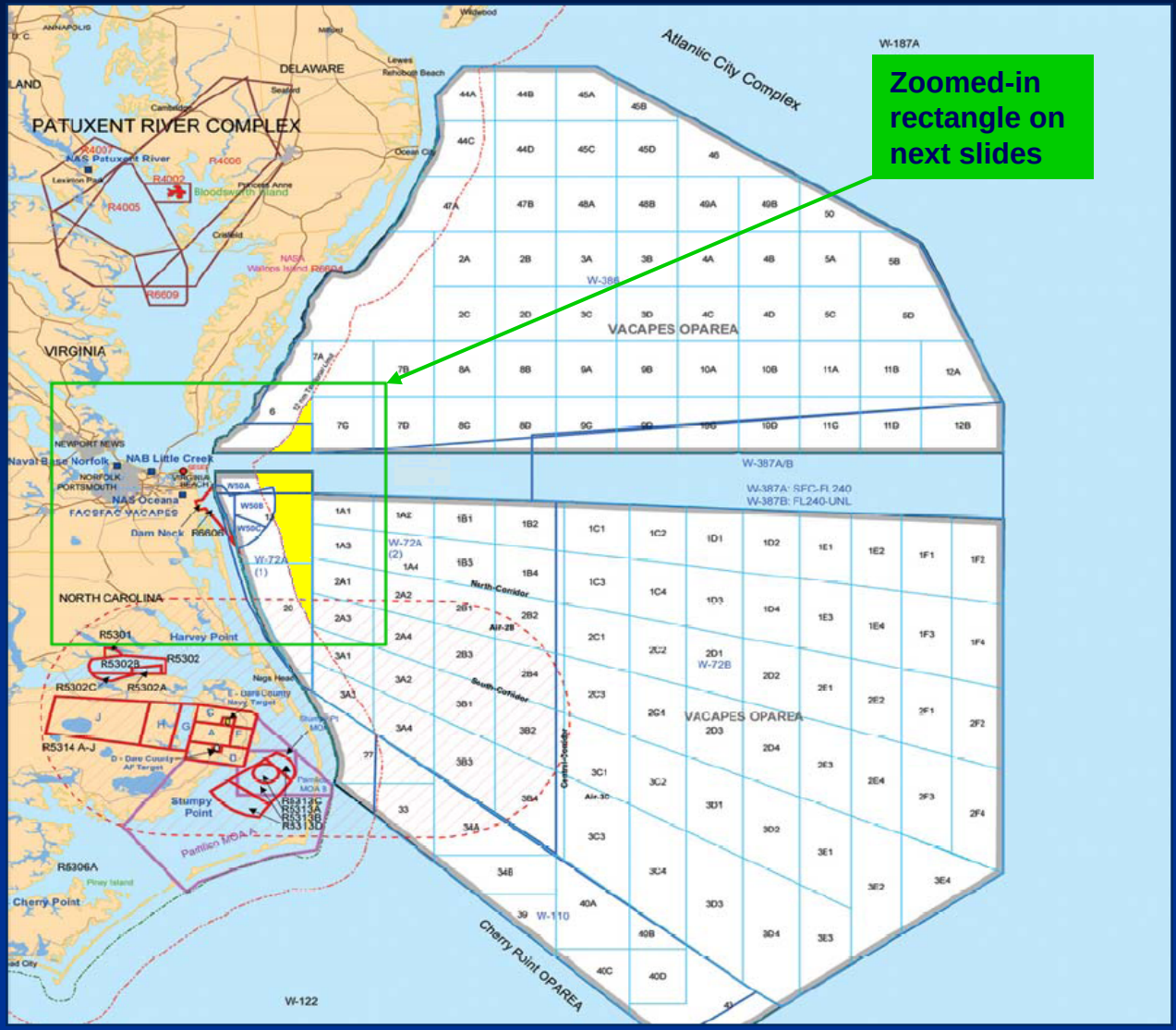
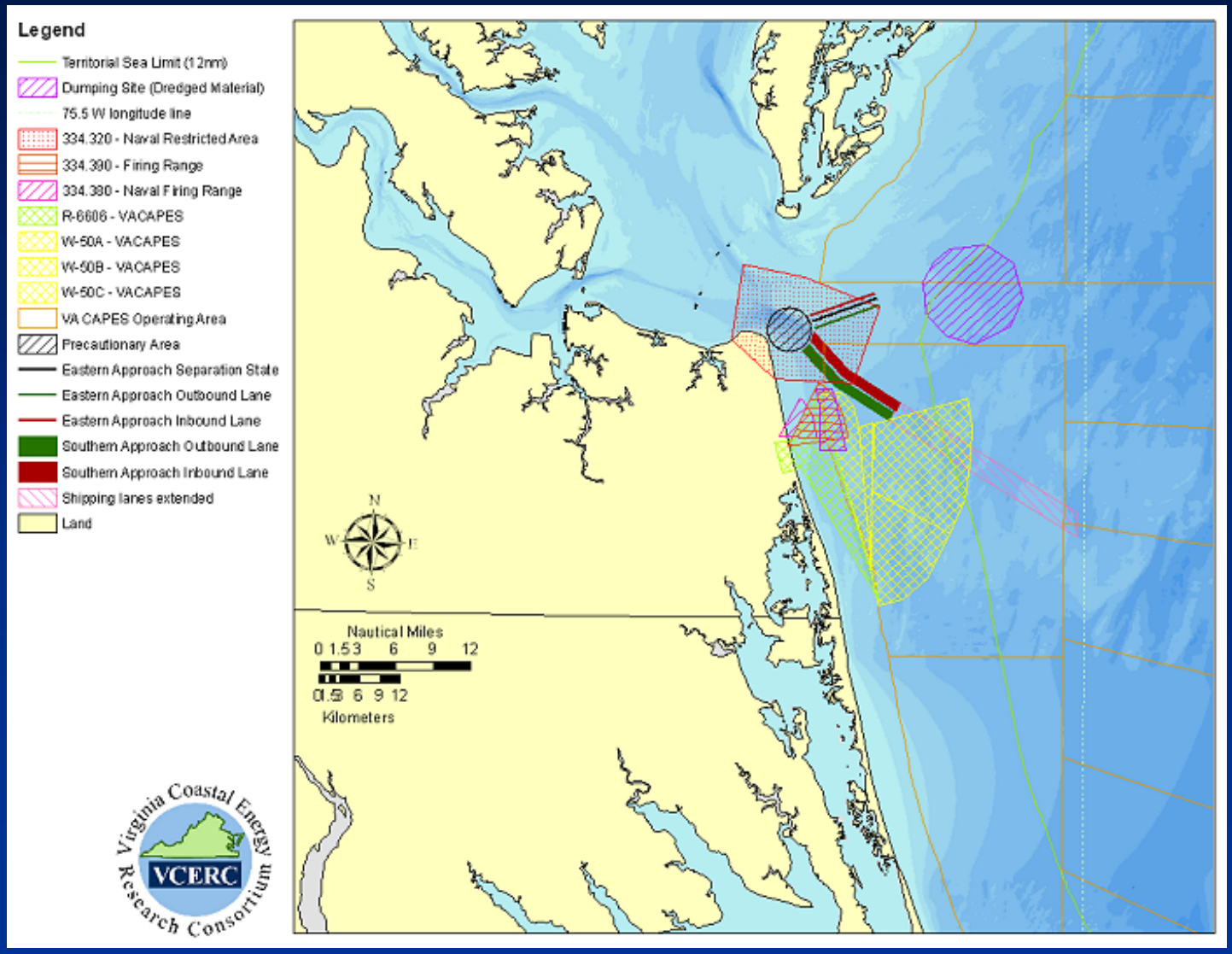
Virginia's Near-Term Offshore Wind Development Potential in Federal Waters

Early Discussions with Navy Examined Possibilities in VACAPES Range W-72A(1)



Areas Identified by VCERC Where Offshore Wind Development is Likely to be Excluded



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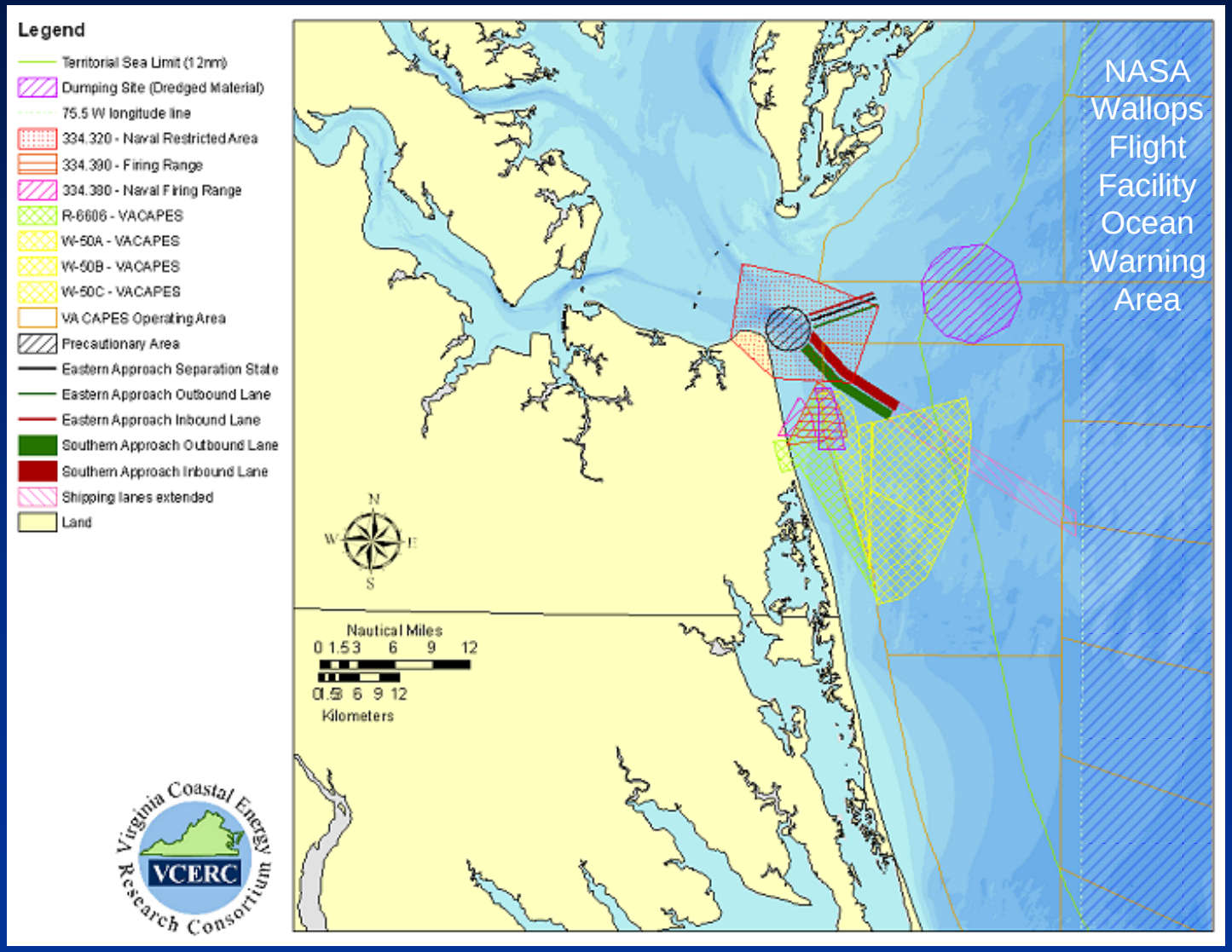
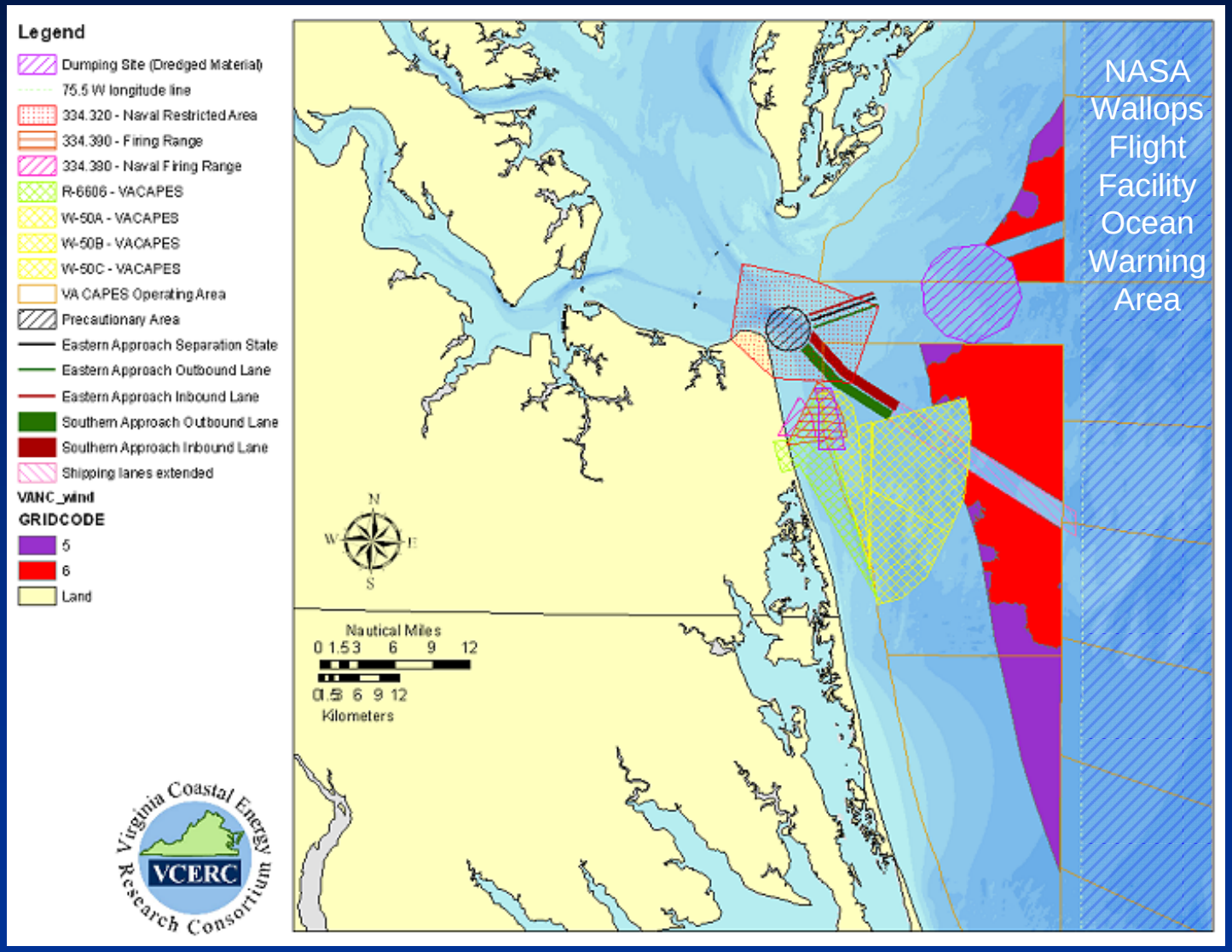
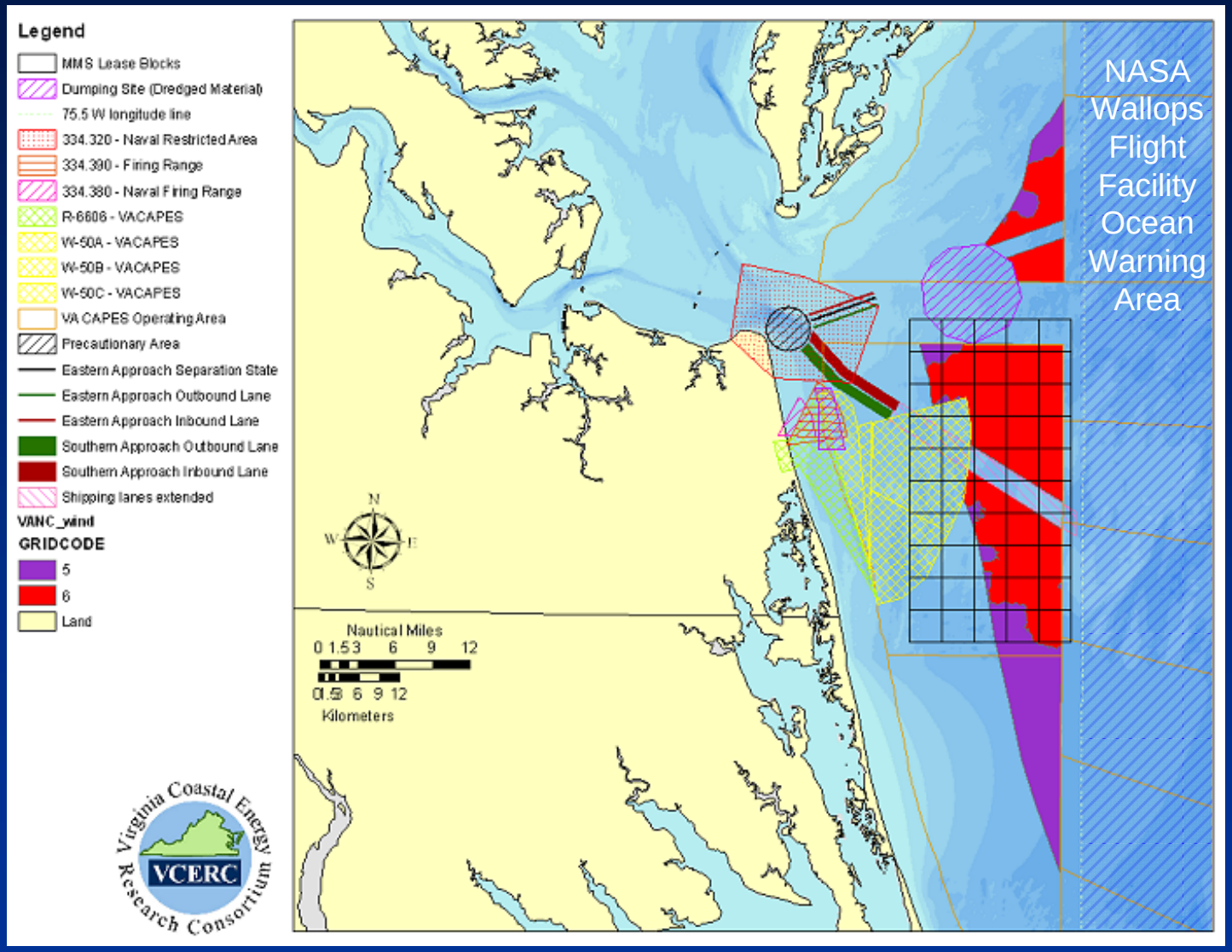


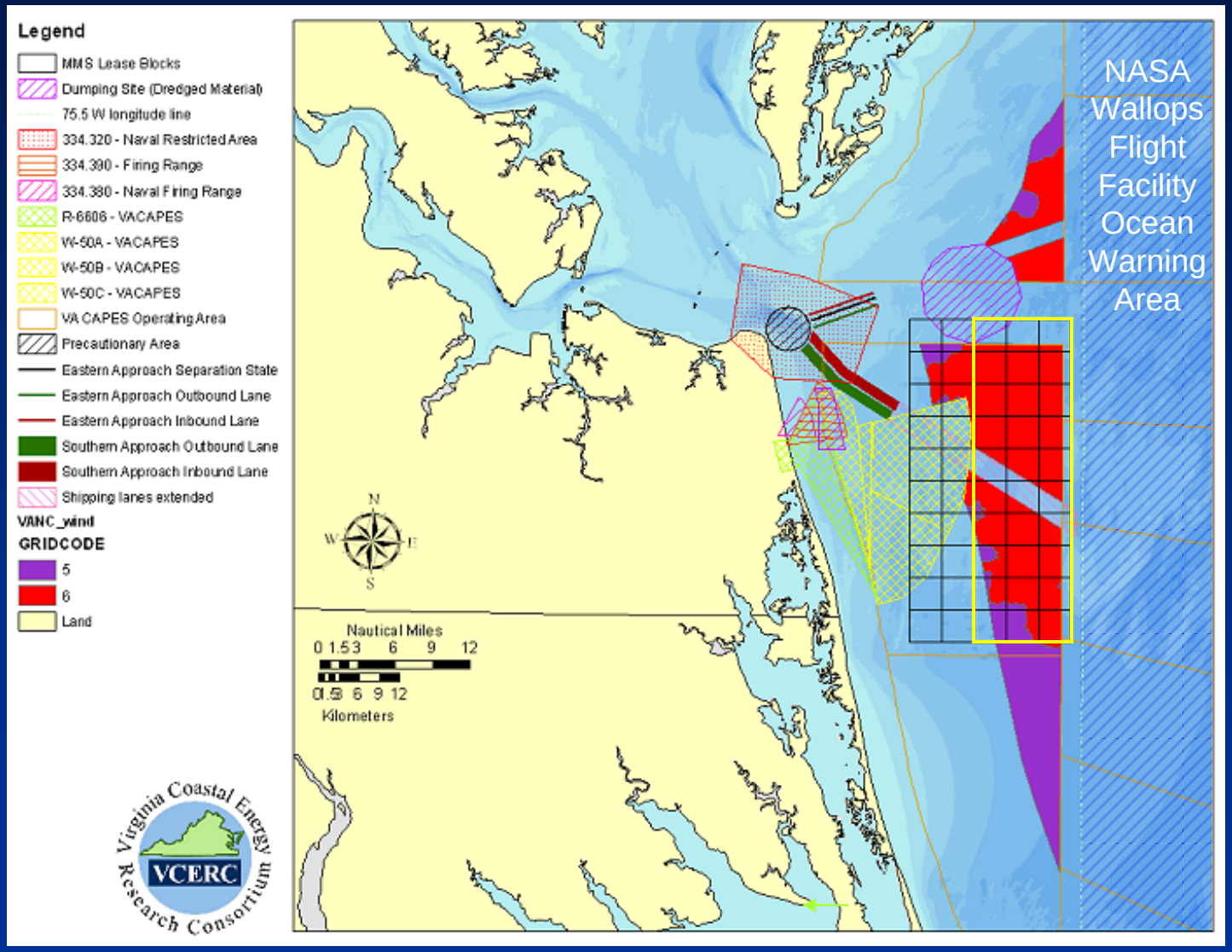
NREL-Mapped Wind Power Density Classes Seaward of 12 n. mi. Territorial Sea Limit



MMS Lease Blocks on OCS off Virginia Beach



Outer 30 Lease Blocks Avoid Most Excluded Areas and are Largely Beyond Visual Horizon



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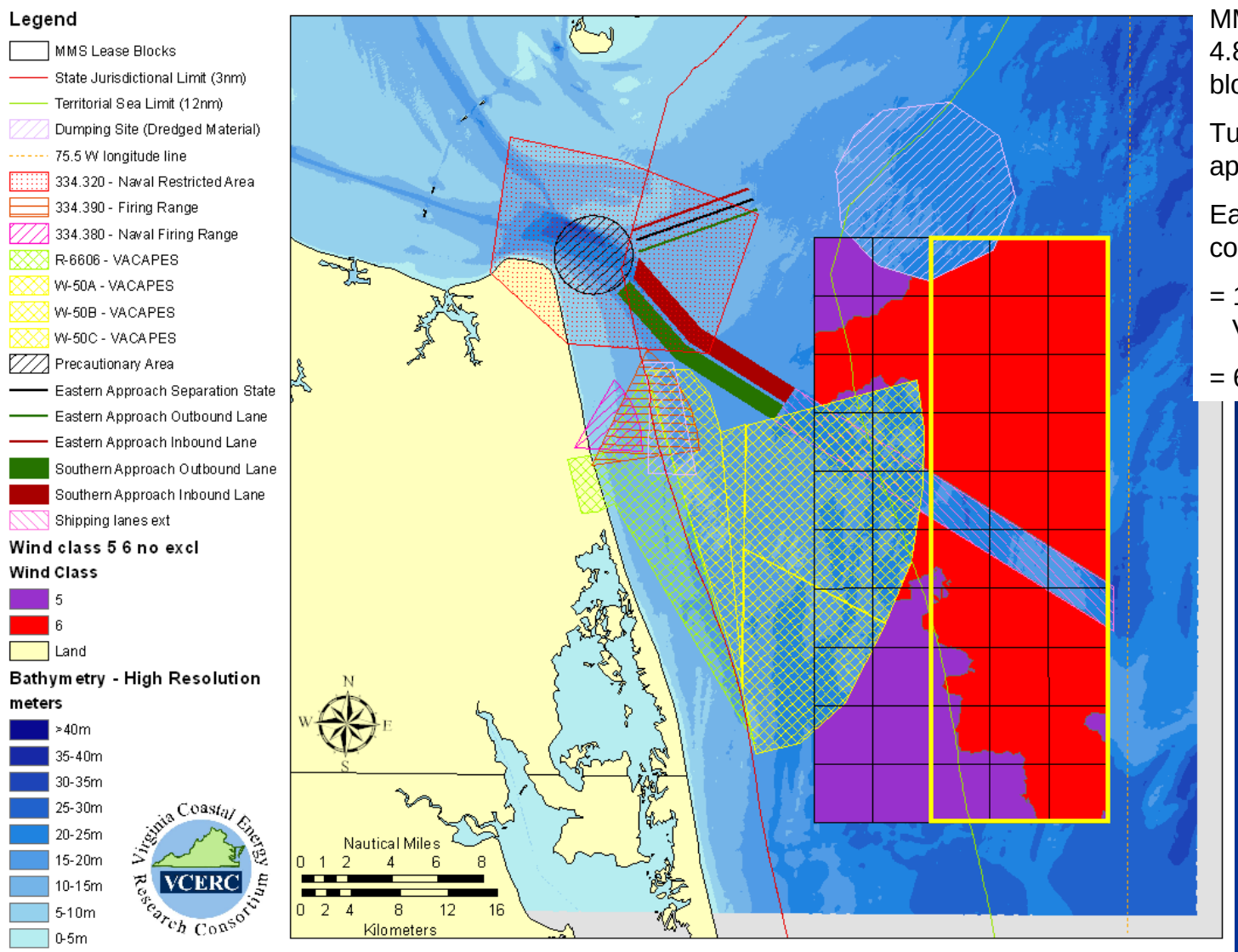

MMS lease blocks are 4.8 km x 4.8 km, with each block having 7 x 7 turbines.

Turbines spaced 685 m apart (7.6 rotor diameters)

Each lease block could contain 49 turbines

= 147 MW per block with Vestas model V-90 3 MW

= 6.4 MW per km^2

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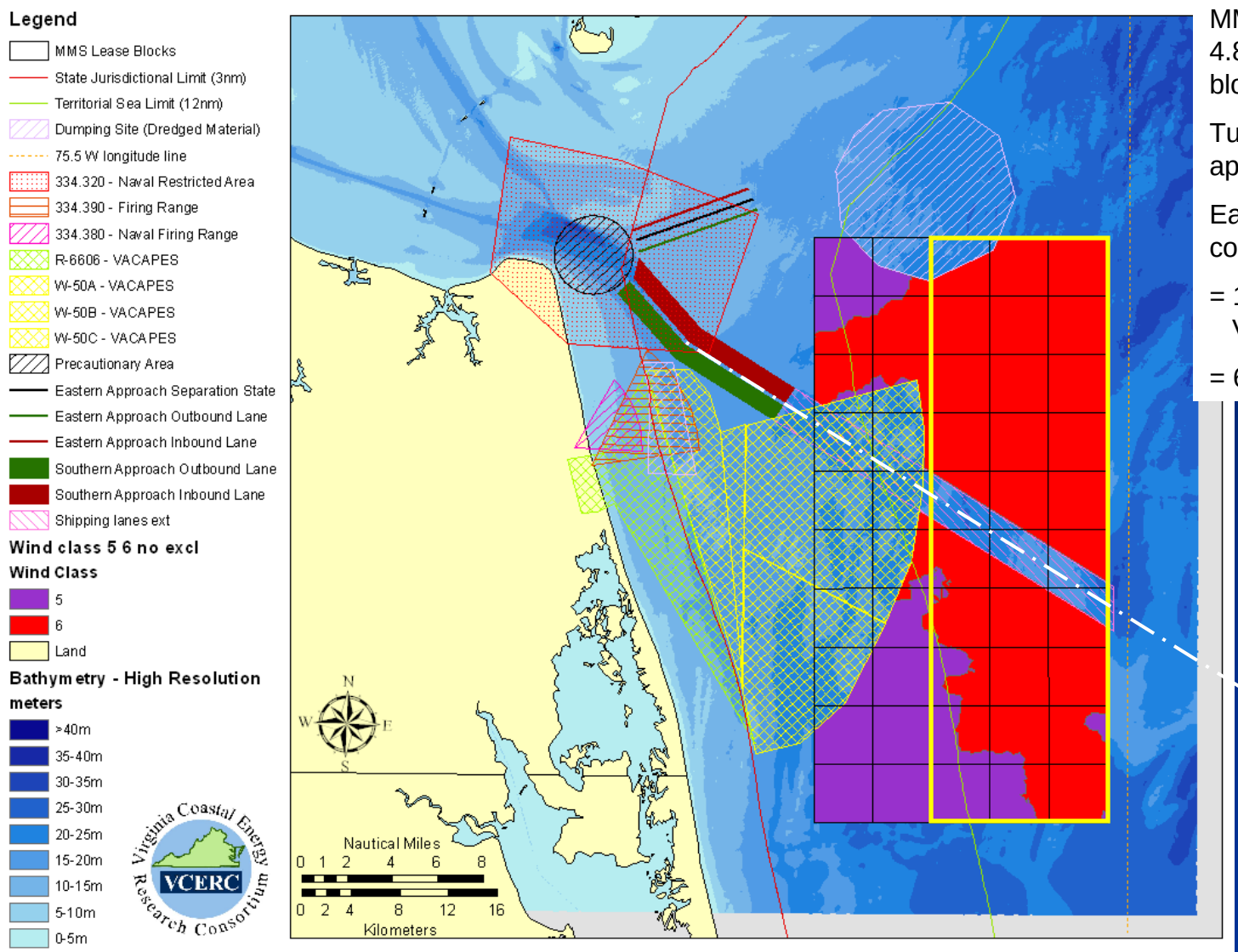

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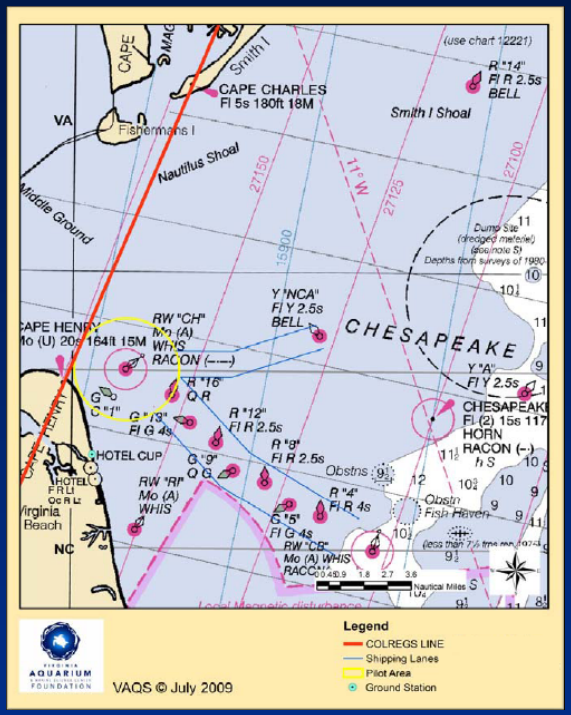
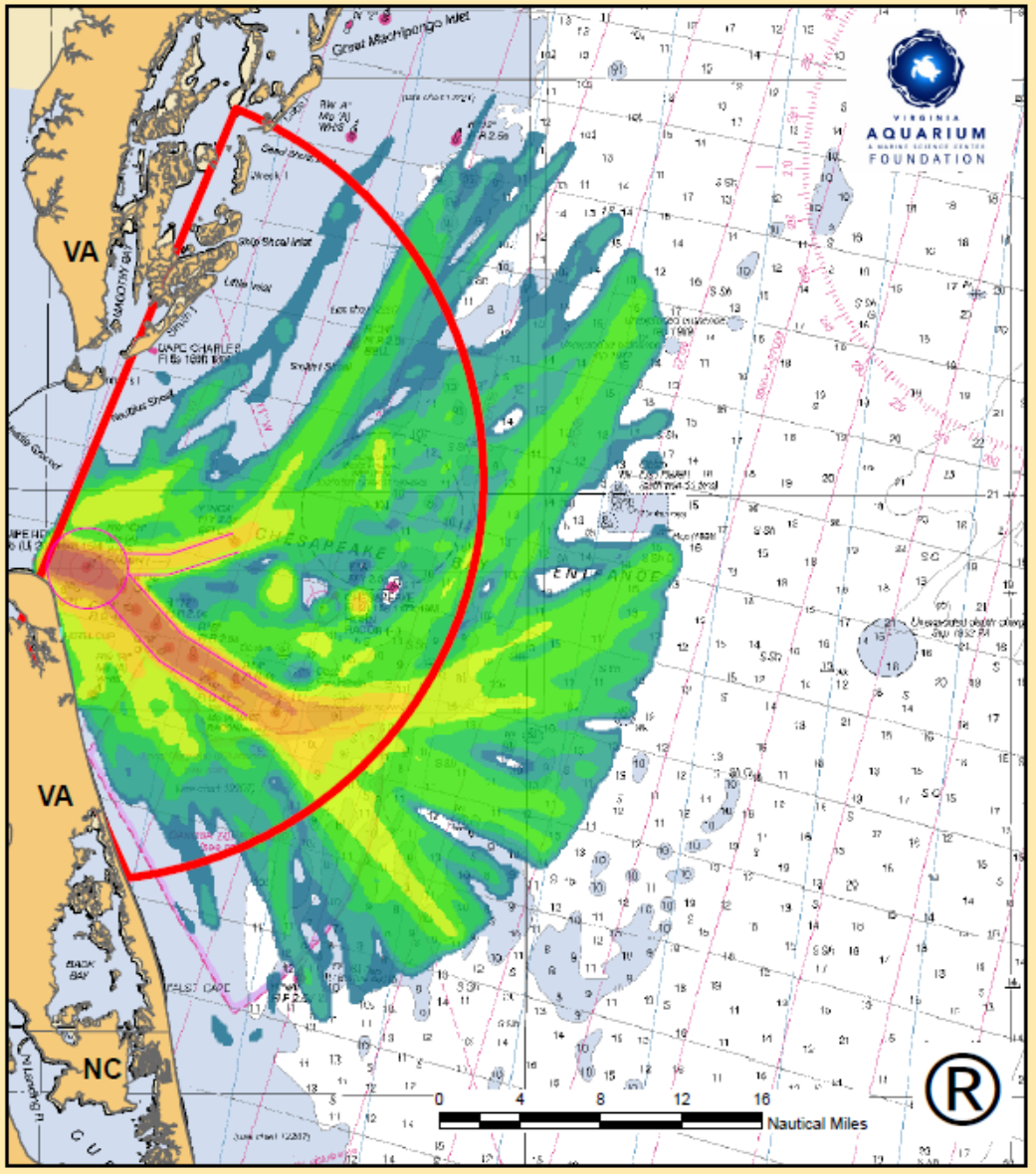
Simple extension of USCG Vessel Traffic Separation lanes is too simplistic

Refined Analysis of Shipping Traffic



Maps provided courtesy of Virginia Aquarium & Marine Science Center



Density of AIS and RADAR Vessels (13:30-21:30 GMT) (April 2008 - March 2009)

Barco, S.G. G.G. Lockhart, K. M. Lagueux, A. R. Knowlton and W.M. Swingle. August 2009. **Characterizing Large Vessel Traffic in the Chesapeake Bay ocean approach using AIS and RADAR**. Final Report for NFWF Award #2006-0093-009 and VDGIF Contract #2007-10280. VAQF Scientific Report 2009-05. Virginia Beach, VA. 42pp.

Refined Analysis of Shipping Traffic

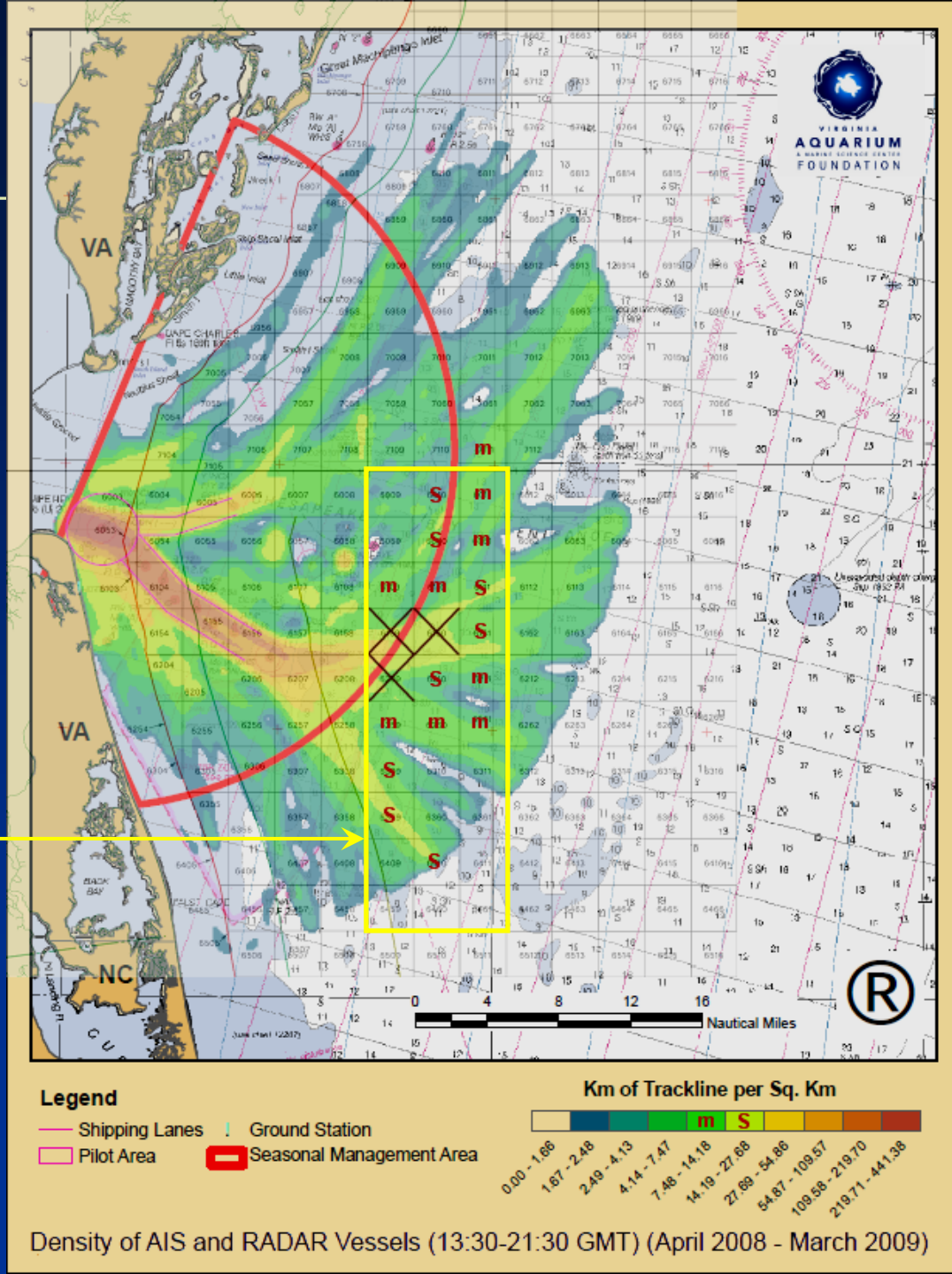
Shipping Traffic Density

X = block at least 50% covered with 14–28 km of vessel track lines per km^2 per year

S = block has some, but less than 50%, coverage by densities of 14–28 km of track lines per km^2 per year

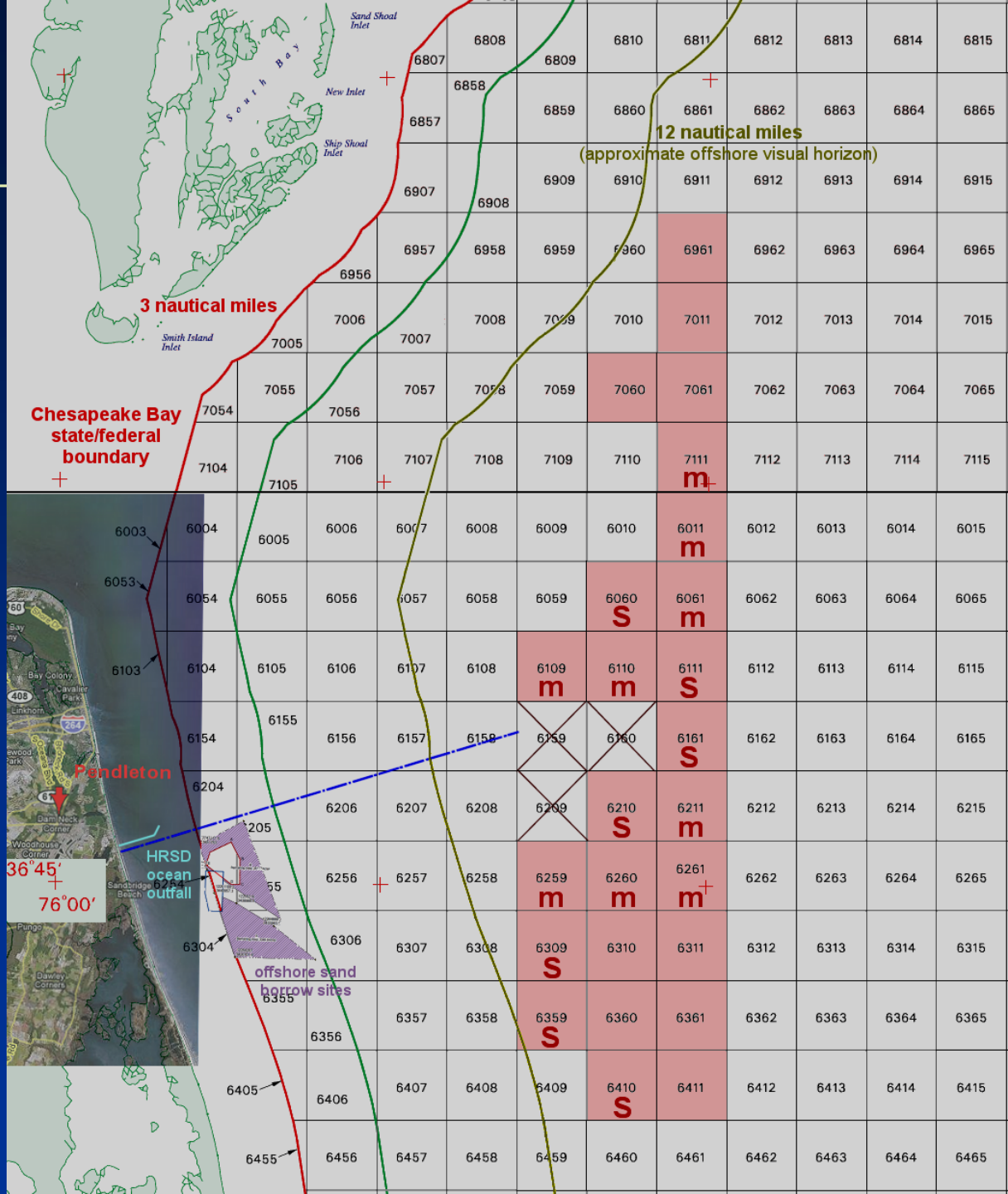
m = block at least 50% covered with 7.5–14 km of vessel track lines per km^2 per year

Outline of 30-block rectangle initially identified by VCERC



Recommended 25 Lease Blocks

Avoiding all excluded uses (military training, dredge spoil disposal, USCG vessel traffic separation scheme) and factoring in observed shipping traffic patterns, VCERC has identified 25 MMS lease blocks of mostly Class 6 winds in water depths <30 m beyond offshore visual horizon that could support between 3,000 and 3,600 MW of wind generation capacity.



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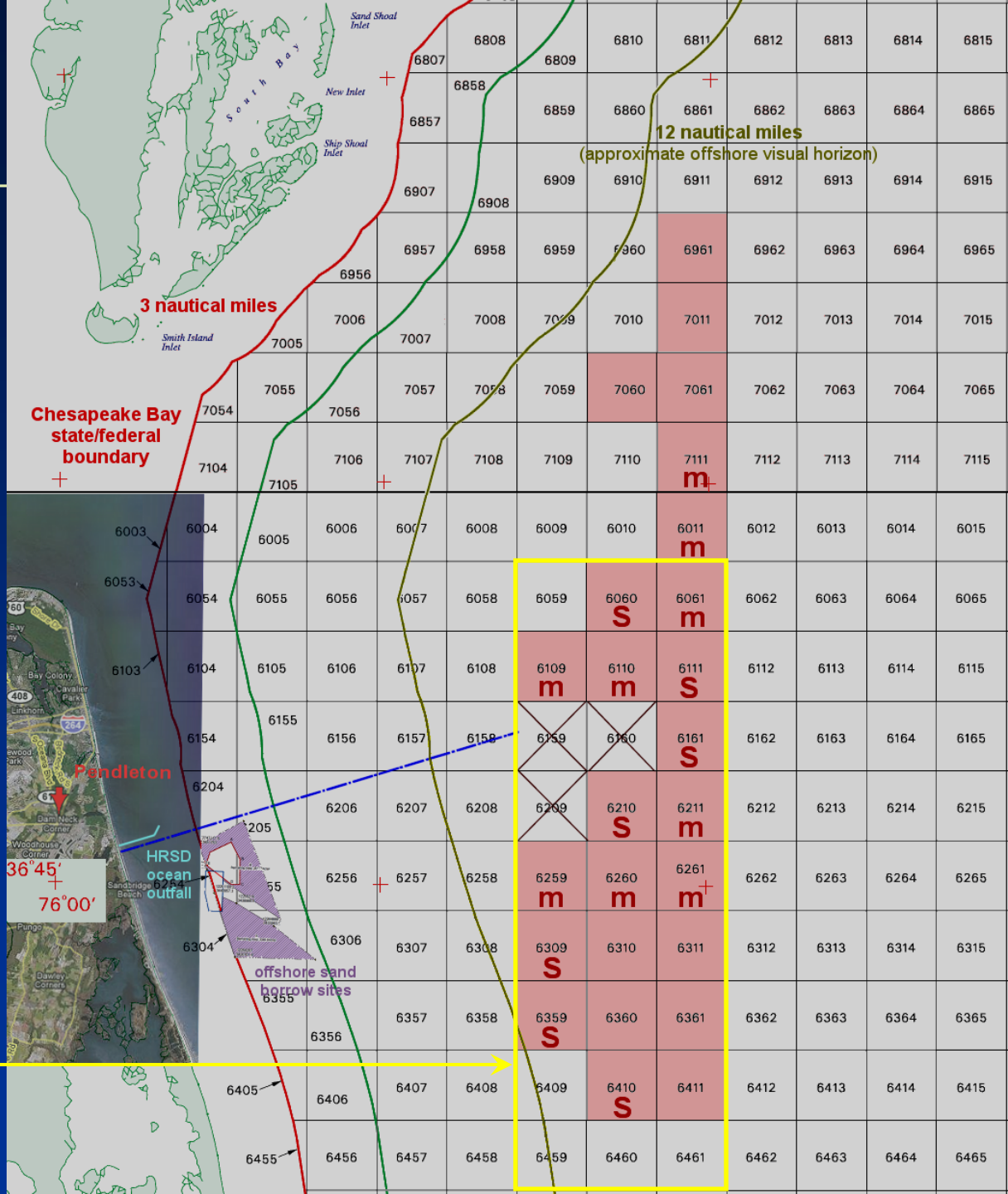

Possible Timetables for Offshore Wind Project Development

Development of Greater Gabbard: 504 MW (UK)

December 2003
•Fluor/Airtricity JV awarded 500MW Greater Gabbard Offshore Wind Farm Project

Greater Gabbard Offshore Winds Ltd

December 2004
•Grid Connection Offer received from National Grid for connection at Sizewell, Suffolk

October 2005
•Consents application submitted

February 2007
• All onshore and offshore consents received
• Siemens selected for wind turbines

May 2008
•Financial Close & Notice to Proceed

October 2003
•Bids submitted for UK Round 2

2004
•Conceptual design
•Offshore Site Surveys
•Environmental
•Geophysical

September 2005
•Met Mast installed

Summer 2006
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October 2007
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•Estimate prepared

FLUOR®

From lease award to construction start = 4.5 years

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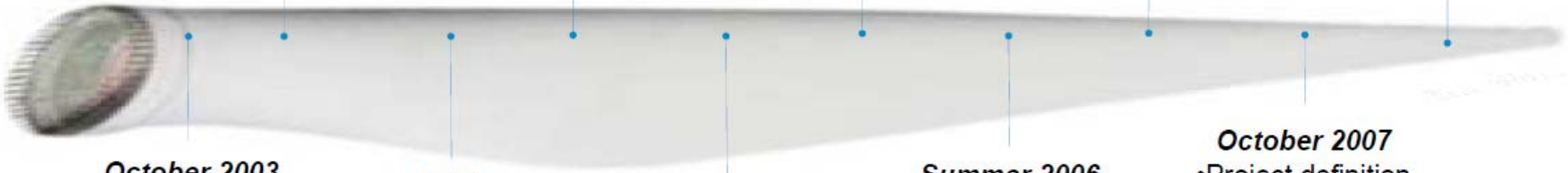

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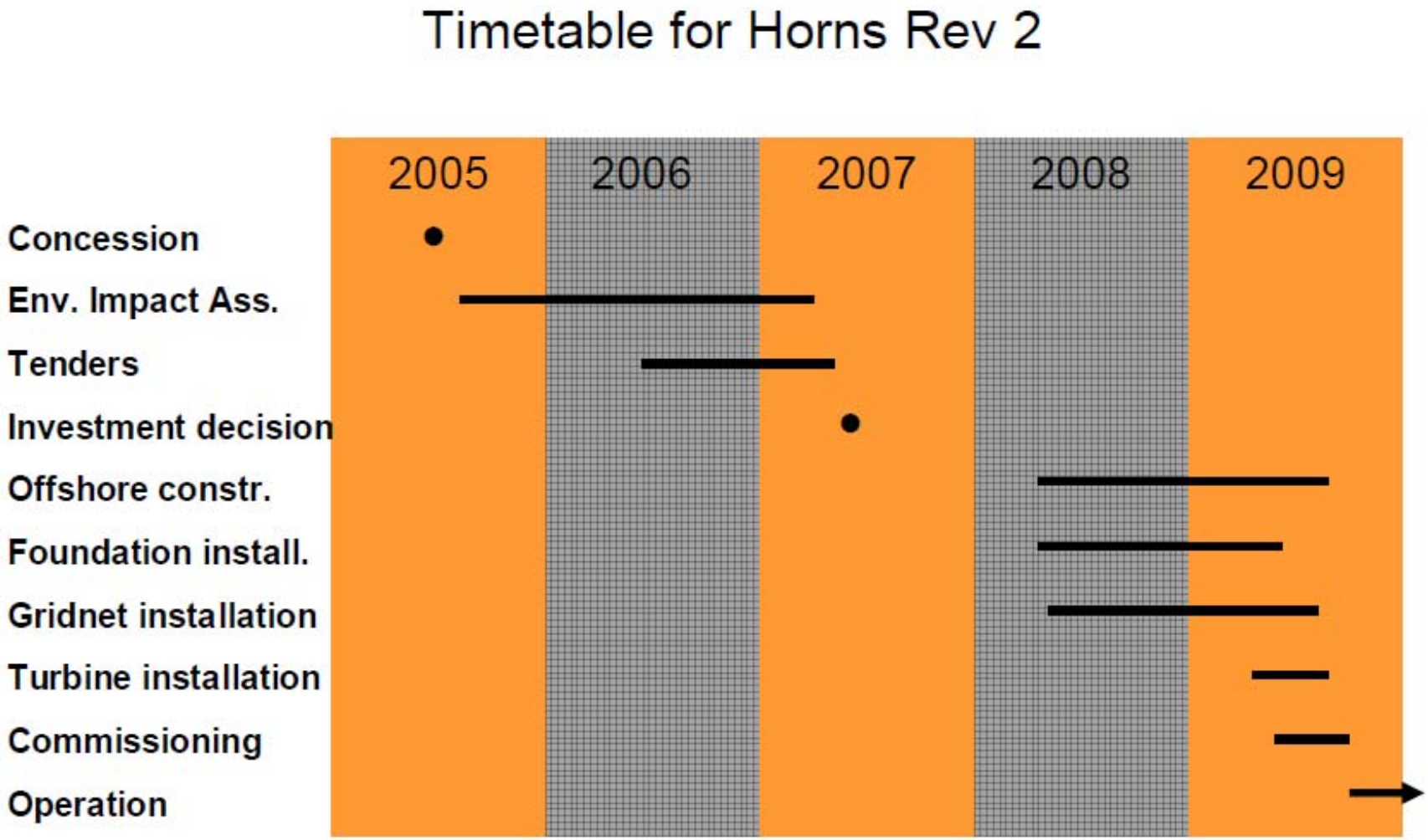
Construction Timetable

Onshore work starts: mid-2008
Offshore work starts: mid-2009
First phase power: mid-2010
Full project power: end 2011

FLUOR®

From construction start to full project power = 2.5 years

Development of Horns Rev II: 209 MW (Denmark)

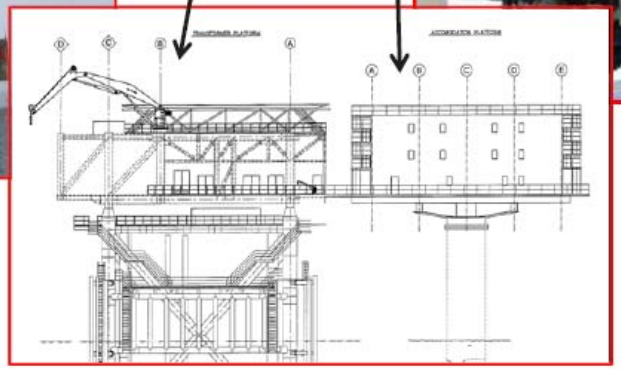


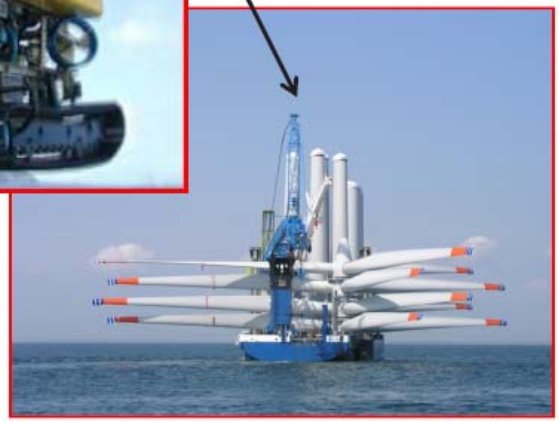
From lease award to construction start = 2.5 years

Construction of Horns Rev II: 209 MW (Denmark)

Horns Rev 2 – Plan for construction

Task Name	2009												2010											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Start of marine works	◆ 19-04																						
Foundation installation																							
Internal grid installation																							
Transformer installation																							
Accomodationplatform installation																							
Commissining of Transformer														◆ 01-05									
Turbine installation																							
Commissioning																							
Final take over																						◆ 15-01	





From construction start to fully commissioned = 1.5 years

DONG energy

US Commercial Offshore Wind Projects

US Offshore Wind Projects		
Project	**State**	**MW**
Cape Wind	MA	468
Hull Municipal	MA	15
Buzzards Bay	MA	300
Rhode Island (OER)	RI	400
New Jersey (BPU)	NJ	350
Bluewater Wind	DE	350
Southern Company	GA	10
W.E.S.T.	TX	150
Cuyahoga County	OH	20
TOTAL		2,068

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